Helping Massachusetts Municipalities Create a Greener Energy Future

COMMONWEALTH OF MASSACHUSETTS

Deval L. Patrick, Governor
Richard K. Sullivan, Jr., Secretary
Mark Sylvia, Commissioner

Fuel Efficient Vehicles for a Municipal Fleet

Webinar

April 6, 2011

10:00 am

Stephen Russell

Alternative Transportation / Clean Cities Program Coordinator

DOER

Helping Massachusetts Municipalities Create a Greener Energy Future

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Introduction: Fuel Efficient Vehicles for a Municipal Fleet

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Meg Lusardi

Director

Green Communities Division

Green Communities Division

Serves as the hub for all Massachusetts cities and towns on energy matters

Helping Massachusetts Municipalities Create A Greener Energy Future

Green Communities Division Programs & Resources for Municipalities

- Green Communities Grant and Planning Assistance Program
- MassEnergyInsight energy tracking and analysis tool
- Municipal Energy Efficiency Program
- Energy Management Procurement Assistance
- ARRA stimulus funding
- Website filled with tools & resources for municipalities www.mass.gov/energy/greencommunities
- Email updates via listserv – Sign up today by sending an email to: join-ene-greencommunities@listserv.state.ma.us

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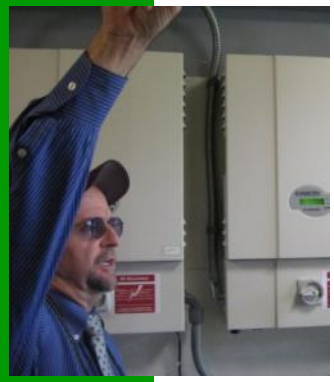
Outreach - Regional Coordinators

- Regional Coordinators act as direct liaisons with cities and towns on energy efficiency and renewable energy activities
- Located at each of the DEP Regional Offices:



SERO – LAKEVILLE: Seth Pickering
Seth.Pickering@state.ma.us

NERO – WILMINGTON: Joanne Bissetta
Joanne.Bissetta@state.ma.us

CERO – WORCESTER: Kelly Brown
Kelly.Brown@state.ma.us

WERO – SPRINGFIELD: Jim Barry
Jim.Barry@state.ma.us

Massachusetts Department of Energy Resources

Helping Massachusetts Municipalities Create A Greener Energy Future

DOER Massachusetts Department of Energy Resources

Recording & Presentation

- The webinar is being recorded and will be available on our website in approximately 48 hours at: www.mass.gov/energy/greencommunities
- The slide presentation will also be posted at: www.mass.gov/energy/greencommunities
- Websites are also listed at end of presentation

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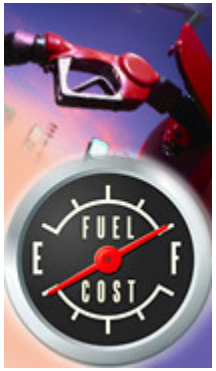
Poll Question 1

We would like to know our audience, are you a:

- 6% Fleet manager
- 44% Energy manager or energy/climate committee member
- 13% Purchasing official or fiscal director
- 0% DPW director
- 38% Other town/school official or volunteer

Webinar Agenda

- DOE Clean Cities and the Massachusetts Clean Cities Coalition
- Where do you start with your vehicles?
- Fuel efficiency
- Alternative fueled vehicles
- Alternative fuels
- Fuel efficient policies for fleet drivers
- Fuel saving technologies



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Clean Cities

Clean Cities' Mission :

To advance the energy, economic, and environmental security of the U.S. by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption in the transportation sector

- Sponsored by the DOE's Office of Energy Efficiency and Renewable Energy's Vehicle Technologies program
- Provides a framework for businesses and governments to work together as a coalition to enhance markets
- Coordinates activities, identifies mutual interests, develops regional economic opportunities, and improves air quality

Local Clean Cities Coalitions Work To:

- Educate fleets, elected officials, and the general public on petroleum reduction
- Encourage the use of alternative technologies
- Expand infrastructure
- Increase demand and help develop market-driven products
- Increase public awareness
- Support regulated fleets

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Clean Cities

U. S. Department of Energy

GREEN COMMUNITIES

Massachusetts DEPARTMENT OF ENERGY RESOURCES

Helping Massachusetts Municipalities Create A Greener Energy Future

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Clean Cities Coalition Meetings

Massachusetts meetings throughout the year to educate its stakeholders about petroleum reduction

Upcoming meetings:

- May 12 - Cape Cod
- June 9 - Springfield
- July 14 - Boston

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Massachusetts Clean Cities Coalition

Housed in the Department of Energy Resources Boston office

- **Director: Stephen Russell, DOE**
- **Co- Director: Mike Manning, Alternative Vehicle Supply Group**

www.mass.gov/energy/cleancities.

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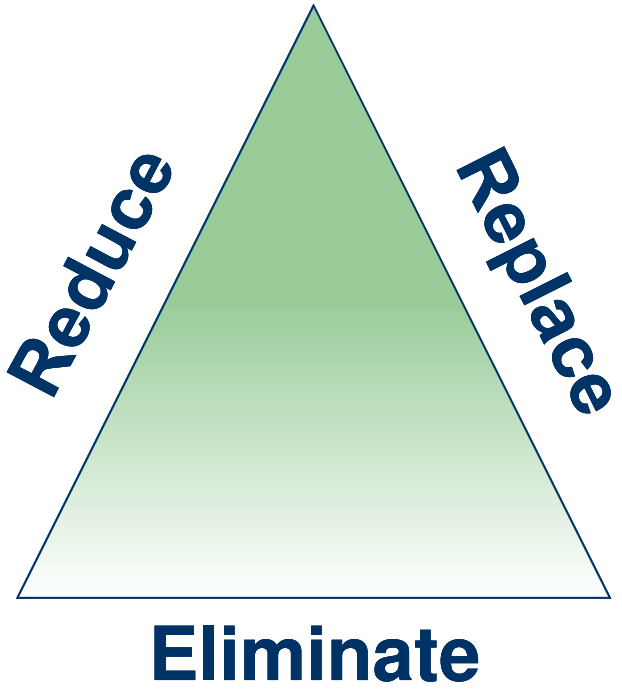
Petroleum Displacement Methods

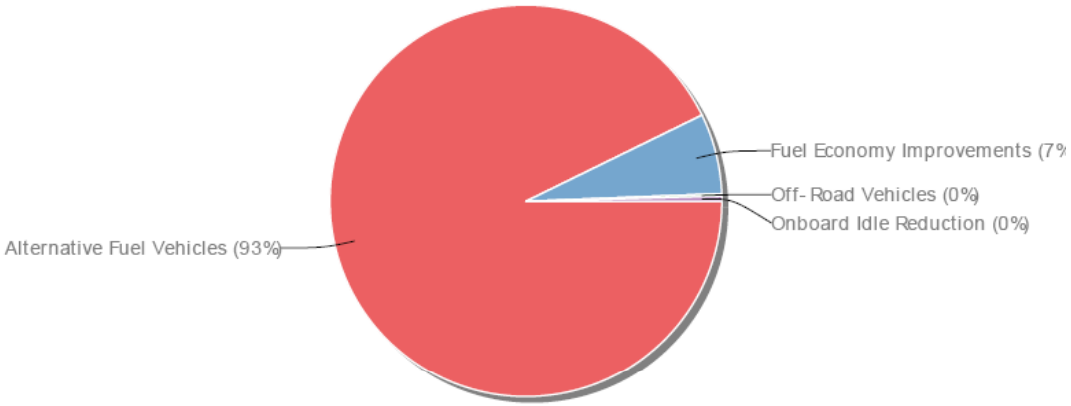
- **Replace** petroleum with alternative fuels and low-level blends.
- **Reduce** by promoting energy efficiency in vehicles through advanced technologies and more fuel efficient vehicles.
- **Eliminate** by promoting idle reduction, greater use of mass transit, trip elimination, and other congestion mitigation approaches.



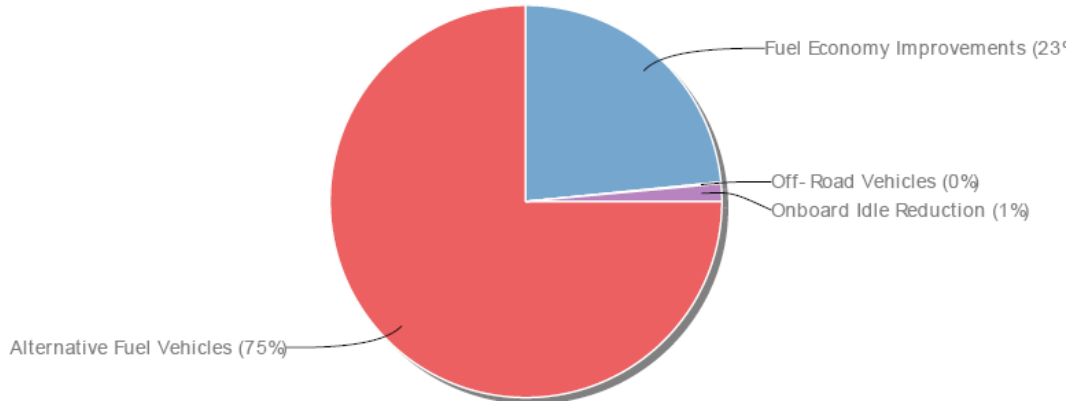
Develop your plan using all approaches

Petroleum Reduced by Massachusetts Clean Cities Coalition in 2010

Gallons of Gasoline Equivalent Reduced
1,051,053 gallons



Greenhouse Gas Emissions Reduced
3,649 tons



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Fuel Efficient Transportation for Cities and Towns

Where does one start?

Let's explore how cities and towns can develop a more fuel efficient fleet and reduce their carbon footprint

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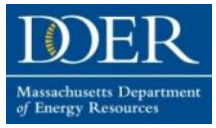


Starting Point – Inventory

- Department, vehicle use description, year, make, model, miles, years in service & MPG

	Staff vehicle list						Dec 21,2007	
Department	Use description	Specialized equipment	Vehicle/eq#	Year / Make / Model	Years in service	Lifetime Miles	Miles per Year	Asset #
Assessing	Building assessments	Radio/decaled	0014	2000 FORD TAURUS	7	30,550	4,364	110
Code	Health inspections	Radio/decaled	0318	2003 FORD TAURUS	4	33,475	8,369	118
Code	Building and site inspections	Radio/decaled	0502	2005 FORD RANGER	2	12,293	6,147	120
Inspection	Building and site inspections	Radio/decaled	0016	2000 CHEVROLET MALIBOU	7	67,879	9,697	114
Inspections	Building and site inspections	Radio/decaled	0314	2003 FORD RANGER	4	23,147	5,787	112
Engineering	Infrastructure improvement inspections	Carries engineering equipment	0024	2000 CHEVROLET S10	7	38,581	5,512	57
Engineering	Infrastructure improvement inspections	Carries engineering equipment	0104	2001 FORD WINDSTAR	6	32,070	5,345	58
Facilities	travel from city building to city building	Radio/ decaled	9804	1998 FORD RANGER	9	50,609	5,623	32
Fire	Fire Chiefs assigned vehicle	Lights radios and gear	9919	1999 FORD CROWN VIC	8	43,485	5,436	19C1
Fire	Fire code enforcement and investigation	Lights radios and gear	9803	1998 FORD RANGER	9	53,585	5,954	19U3

Replacement Schedule

- Calculate “lifecycle costs” of all vehicles (based on age/ mileage/ maintenance costs)
- Develop a replacement schedule

Variable Data		Description:
Model:	Vehicle A	Vehicle model being analyzed
Vehicles in Fleet:	3	Total number of vehicles of this type in fleet
Annual Miles Driven:	8,753	Expected miles to be driven each year
Annual Shifts:	365	The number of normal man-shifts the vehicle operates during a year
Maximum Replacement Years:	5	Upper limit for years to hold a vehicle based on policy decision
Maximum Replacement Miles:	60,000	Upper limit for mileage to hold a vehicle based on policy decision
Net Acquisition Cost:	$ 122,000.00	Net purchase price including all make-ready expenses
Return on Investment:	2.500%	The annual percentage rate earned on cash investments
Fuel Miles-per-Gallon	5.1	Mileage of vehicle being analyzed
Fuel Cost-per-Gallon:	$ 1.55	Fuel cost-per-gallon
Pool Loaner Cost-per-Mile:	$ 30.00	Cost-per-Mile of providing a backup vehicle while the primary vehicle is being worked on

Mainte

	Mileage	Parts & Labor	Shifts Down	1-Year			2-Years			3-Years			
Service/Repair	Interval	Cost	per Incident	Freq.	Repair	Down	Freq.	Repair	Down	Freq.	Repair	Down	Fr
PM A with safety inspection	3,000	$ 100	0.5	2	$ 200	$ 719	5	$ 500	$ 1,799	8	$ 800	$ 2,878	
PM B (A + transmission service)	20,000	$ 88	0.5	0	$ -	$ -	0	$ -	$ -	1	$ 88	$ 360	
PM C (A + tune up)	50,000	$ 150	0.5	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
air conditioning	50,000	$ 450	0.5	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
auxiliary - lights, siren, radio	40,000	$ 150	0.5	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
battery	50,000	$ 75	1.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
brake - pads, disc, drum	25,000	$ 120	1.0	0	$ -	$ -	0	$ -	$ -	1	$ 120	$ 719	
brakes - master cylinder, calipers, ABS	60,000	$ 400	1.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
cooling system	50,000	$ 140	1.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
engine	105,000	$ 4,500	5.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
exhaust	50,000	$ 200	0.5	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
front end/suspension	50,000	$ 120	1.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
tires	25,000	$ 280	0.5	0	$ -	$ -	0	$ -	$ -	1	$ 280	$ 360	
transmission	105,000	$ 3,000	3.0	0	$ -	$ -	0	$ -	$ -	0	$ -	$ -	
miscellaneous	5,000	$ 1,000	1.0	1	$ 1,000	$ 719	3	$ 3,000	$ 2,158	5	$ 5,000	$ 3,597	
Lifecycle Cost by Type Expense:					$ 1,200	$ 1,439		$ 3,500	$ 3,957		$ 6,288	$ 7,914	
Lifecycle Total:					$ 2,639			$ 7,457			$ 14,202		
Annual Cost by Type Expense:					$ 1,200	$ 1,439		$ 1,750	$ 1,978		$ 2,096	$ 2,638	
Annual Total:					$ 2,639			$ 3,728			$ 4,734		

Justify All Vehicles

Fleet Services Vehicle /Equipment justification

The unit listed below is scheduled for replacement in FY xx/xx. This form must be completed and presented to the Fleet Administrative review committee. Please send a copy to Steve Russell of each completed form so he can make copies for the fleet committee to review.

Department_____

Unit #'s_____ Make _____ Model_____ Year _____

Attached you will find a sheet detailing the current miles etc. on the vehicle.

Do you agree that this unit should be replaced per the schedule ____yes ____ no

Is there additional equipment on vehicle (please list)_____

Justification;

Jobs performed with this equipment/ vehicle_____

_____

_____

How often are the above jobs performed_____?

_____

Additional comments on tasks performed by vehicle or equipment_____

_____

How would job be performed if this equipment/vehicle were not available?

_____

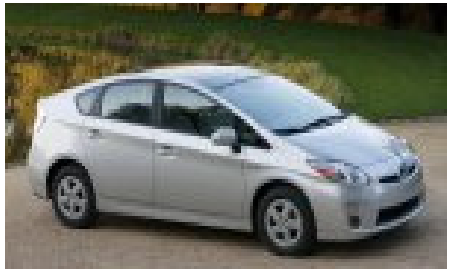
_____

If this vehicle /equipment should be replaced with something different than what is scheduled please state the reasons here:

Future Purchases Should Be Fuel Efficient Vehicles

- EPA tests all light duty cars and pickups for MPG
- EPA has a best in class in the MPG category
- Fuel economy guide available on Clean Cities website

Best in class for MPG



One of the worst in class for MPG

Poll Question 2

Do you know how much your town/school spends on fuel each year?

13% Yes, for each vehicle

44% Yes, for each department

19% Yes, for the whole town/school system

38% No

Increase Fuel Mileage in Your Fleet!

- If you are using those old police cruisers for staff transportation then STOP!

- 18 MPG versus 39 MPG with a hybrid vehicle is a real winner!

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The Numbers: Used Crown Vic

Used Police Cruisers, Anticipated Costs

Year	Initial Costs (1)	Annual Costs (2)	Fuel Costs (3)	Annual
1	$ 1,200.00	$ 400.00	$ 3,333.33	$ 4,933.33
2		$ 750.00	$ 3,333.33	$ 4,083.33
3		$ 750.00	$ 3,333.33	$ 4,083.33
4	$ 1,200.00	$ 400.00	$ 3,333.33	$ 4,933.33
5		$ 750.00	$ 3,333.33	$ 4,083.33
6		$ 750.00	$ 3,333.33	$ 4,083.33
7	$ 1,200.00	$ 400.00	$ 3,333.33	$ 4,933.33
8		$ 750.00	$ 3,333.33	$ 4,083.33
9		$ 750.00	$ 3,333.33	$ 4,083.33
10	$ 1,200.00	$ 400.00	$ 3,333.33	$ 4,933.33
Totals:	$ 4,800.00	$ 6,100.00	$ 33,333.33	$ 44,233.33

Total Ten Year Cost: $ 44,233.33
Avg Per Year: $ 4,423.33

(1) Biased on costs to make car with 100k road worthy, good for 5 years
(2) Anticipated Costs, ie. Drive train, suspension, brakes, emissions, etc.
(3) Biased on EPA Data from Ford Motor Company (12 Miles per gallon), 10000K miles per year @ $4.00 per gallon

The Numbers: Ford Escape Hybrid

New Ford Escape Hybrid, Anticipated Costs

Year	Initial Costs (1)	Annual Costs (2)	Fuel Costs (3)	Annual
1	$ 23,000.00		$ 1,176.47	$ 24,176.47
2			$ 1,176.47	$ 1,176.47
3		$ 100.00	$ 1,176.47	$ 1,276.47
4			$ 1,176.47	$ 1,176.47
5			$ 1,176.47	$ 1,176.47
6		$ 300.00	$ 1,176.47	$ 1,476.47
7		$ 250.00	$ 1,176.47	$ 1,426.47
8			$ 1,176.47	$ 1,176.47
9		$ 100.00	$ 1,176.47	$ 1,276.47
10			$ 1,176.47	$ 1,176.47
Totals:	$ 23,000.00	$ 750.00	$ 11,764.71	$ 35,514.71

Total Ten Year Cost: $ 35,514.71
Avg Per Year: $ 3,551.47

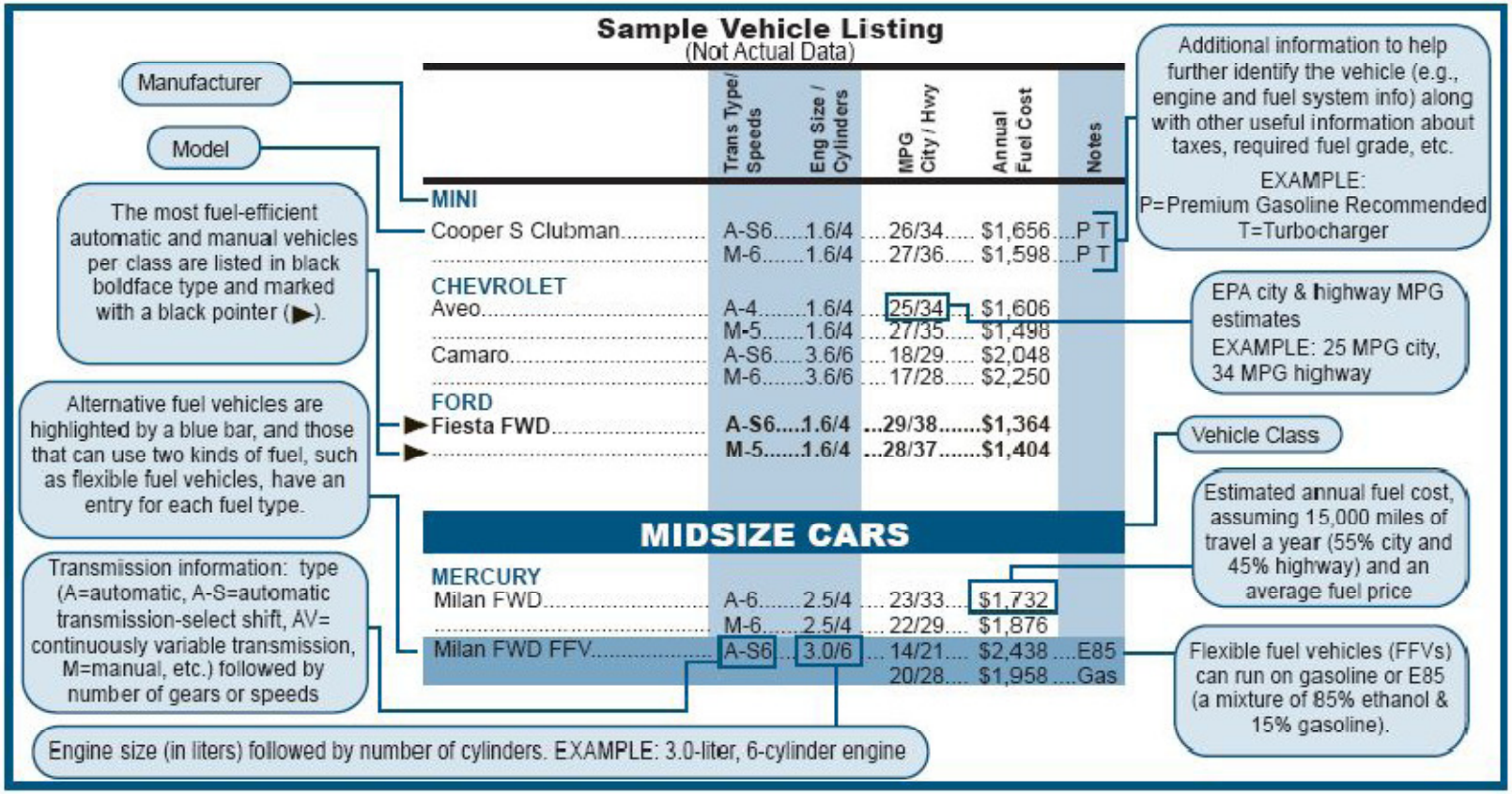
(1) Biased on costs of new vehicle off of Kelly Blue Book Values
(2) Anticipated Costs, ie. Drive train, suspension, brakes, emissions, etc.
(3) Biased on EPA Data from Ford Motor Company (26 Miles per gallon), 10000K miles per year @ $4.00 per gallon

Overall Savings From Not Re-Using Police Crown Vic Cruisers

Overall Comparison:

Vehicle	Cost per Year	Ten Year Cost	Savings
Used Police Car	**$ 4,423.33**	$ 44,233.33	
New Ford Ranger	$ 2,913.46	$ 29,134.62	$ 15,098.72
New Ford Escape Hybrid	$ 3,551.47	$ 35,514.71	$ 8,718.63
New Toyota Prius Hybrid	$ 3,063.89	$ 30,638.89	$ 13,594.44

Sample Vehicle Listing From EPA Fuel Economy Guide



Clean Cities Portfolio of Alternative Fuels

Alternative Fuels

- Biodiesel (B100)
- Electricity
- Ethanol (E85)
- Hydrogen
- Natural gas
- Propane (autogas)

Fuel Blends – commonly used

- Biodiesel/diesel blends (B2, B5, B20)
- Ethanol/gasoline blends (E10)
- Hydrogen/natural gas blends (HCNG)

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Clean Cities Portfolio of Technologies

Fuel Economy

- Fuel efficiency
- Behavioral changes
- Vehicle maintenance initiatives
- Vehicle miles traveled (VMT)

Hybrids

- Light- and Heavy-duty Hybrid Electric Vehicles
- Plug-in Hybrid Electric Vehicles

National Lumber's heavy duty hybrid truck

Idle Reduction

- Heavy-duty trucks
- School buses
- Truck stop electrification

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Alternative Fueled Vehicles

Wheel Loader using biodiesel, propane lawnmower, symbols on vehicles that can use E-85 & a Ford Fusion Hybrid

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Alternative Fueled Vehicles

Biodiesel heavy-duty truck, all-electric Nissan Leaf, & hydrogen fuel cell vehicle

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Poll Question 3

Does your town/school use any alternative fuels or vehicles?

11% Yes, biodiesel
0% Yes, electric vehicles
32% Yes, hybrid vehicles
0% Yes, CNG vehicles
58% No

So How Do I Choose A Fuel?

- CNG now costs less per gallon than diesel fuel
- Hybrids – in the right application can mean a fuel savings of over 30%. ROI is 3 to 4 years
- Battery electric vehicles will operate at $1.00 per gallon equivalent
- Biodiesel (B20) can increase MPG by 1 to 2 miles
- Hydrogen vehicles are about 15 years away

CNG VEHICLES

Medium-duty: Vans and Shuttles.

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Reduce Idling

Idling more than 5 minutes in MA is against the law

MGL, Chapter 90, 16A and 310 CMR, 7.11:

"No person shall cause, suffer, allow, or permit the unnecessary operation of the engine of a motor vehicle while said vehicle is stopped for a foreseeable period of time in excess of five minutes."

Dispel the myths

- Turbo diesel trucks do not need to idle to warm up or cool down
- Idle no more than 30 seconds; starting the car more often does not hurt the starter

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Fuel Reduction Technologies

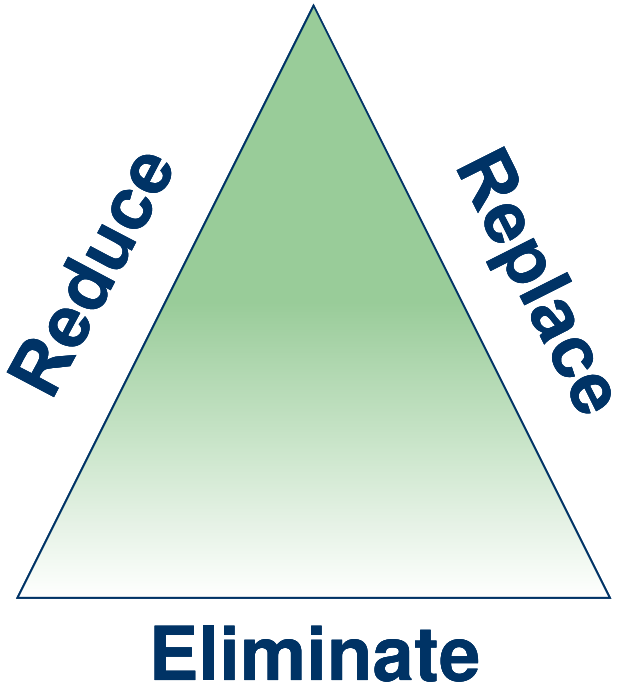
- Limit top speed of vehicles to 60 MPH
- Use Zipcar technology (shared vehicles)
- Idle-Rite device: Turns the engine into a generator when idling for a long period of time.

IDLERIGHT™ FUEL MANAGEMENT SYSTEM Patent Pending

- Use LED emergency lights - they do not drain batteries = less idling = less fuel use and pollution.
- Stay away from "fuel-saving" additives! Ask for EPA verification letter from those vendors.

Petroleum Displacement Methods

- **Replace** petroleum with alternative fuels and low-level blends.
- **Reduce** by promoting energy efficiency in vehicles through advanced technologies and more fuel efficient vehicles.
- **Eliminate** by promoting idle reduction, greater use of mass transit, trip elimination, and other congestion mitigation approaches.



Develop your plan using all of the above

Fuel Efficiency Policies & Actions

- Develop a plan to replace old vehicles with energy efficient vehicles
- Justify all vehicles
- Evaluate take home vehicle policy
- Develop fuel use reporting program
- Develop anti-idling policy
- Discuss proper driving habits to save fuel

Poll Question 4

In the next month, I will work with my town/school/fleet to:

- 46% Create a vehicle inventory and replacement plan
- 0% Implement route planning
- 23% Investigate car-sharing options
- 15% Draft an enforceable anti-idling policy
- 15% Discuss fuel-saving driving behaviors with vehicle drivers

No Silver Bullet

Take a look at your fleet and find the right alternative fuel or vehicles that work for each operation. GO FOR IT!

When prices of of a gallon of gas gets to $6.00, issue bikes

Q&A

Resources

- Vehicle MPG information:
  www.Fueleconomy.gov
- Petroleum reduction tool:
  https://www.afdc.energy.gov/afdc/prep/index.php
- Massachusetts Clean Cities web site:
  www.mass.gov/energy/cleancities.

DOER Contacts

- Alternative fuel/vehicles and general fleet questions:
  Stephen.Russell@state.ma.us

- DOER Regional Coordinators:
  - Southeast: Seth.Pickering@state.ma.us
  - Northeast: Joanne.Bissetta@state.ma.us
  - Central: Kelly.Brown@state.ma.us
  - Western: Jim.Barry@state.ma.us

THANK YOU!

- The webinar was recorded and will be available for viewing at your convenience on our website at:

  www.mass.gov/energy/greencommunities

- The slide presentation will also be posted at:

  www.mass.gov/energy/greencommunities